

[This application claims priority of U.S. Provisional Application, Serial No. 60/249,678, filed November 17, 2000 entitled: "System and Method for Holographic Deposition of Material", and is incorporated herein by reference in its entirety.]

#### IN THE CLAIMS

1. (Currently Amended) An apparatus for forming a three-dimensional **solid** structures from a **gaseous** medium, ~~the apparatus~~ comprising:

**a processing chamber to contain the gaseous medium; and**

**a holographic projector for to projecting an electromagnetic energy in the form of at least one hologram into the gaseous medium within the processing chamber, the electromagnetic energy in the form of the at least one wherein the** hologram imparting energy to **dissociate gas precursors within the gaseous medium causing dissociated gas precursors to deposit in a pattern corresponding to the at least one hologram, the medium changing through at least one phase to form a solid three-dimensional structure.**

2. Canceled.

3. (Currently Amended) The apparatus of Claim 1 wherein the **gas precursors within the medium is are a** gaseous organometallic compounds.

4. Canceled.

5. Canceled.

6. Canceled.

7. An apparatus to deposit for forming a three-dimensional solid structure ~~from a medium, the apparatus~~ comprising:

a holographic projector to for projecting ~~an electromagnetic energy in the form of the~~ a series of holograms;

a gaseous delivery system to deliver gas precursors; and

~~a vessel containing the medium~~ a processing chamber, wherein the processing chamber further comprises: the vessel having

a window, wherein the window is being transparent to the ~~electromagnetic energy in the form of the~~ holograms; ~~the electromagnetic energy in the form of the~~ hologram passing through the window and into the medium, the electromagnetic energy in the form of the hologram imparting energy to the medium, the medium changing through at least one phase to form a solid three dimensional structure.

a plane on which the holograms are imaged;

an inlet to receive the gas precursors from the gaseous delivery system, wherein the hologram imparts energy to dissociate the gas precursors causing dissociated gas precursors to deposit in the plane in a pattern corresponding to the hologram; and

an outlet to exhaust effluent from the processing chamber.

8. The An apparatus of Claim 7, wherein the holographic projector further comprises: for forming a three dimensional solid structure from a gaseous medium, the apparatus comprising:

a laser light source to for generateing a coherent collimated electromagnetic energy;

~~a collimating means, the coherent electromagnetic energy passing through the collimating means to form a collimated electromagnetic energy;~~

a computer driven phase plate placed in a path of the coherent collimated electromagnetic energy ~~a spatial light modulator, the collimated electromagnetic energy passing through the spatial light modulator to~~ the hologram. form at least one hologram of electromagnetic energy, ~~the at least one hologram of electromagnetic energy passing into the gaseous medium;~~

~~a vessel operable to hold a gaseous medium;~~

~~a window contiguous with a wall of the vessel, the window transparent to the electromagnetic energy in the form of the at least one hologram;~~

~~an inlet line connected to the vessel, the inlet line operable to selectively flow the gaseous medium into the vessel;~~

~~an outlet line connected to the vessel, the outlet line operable to selectively flow the gaseous medium from the vessel; and~~

~~a platform situated in the vessel, the electromagnetic energy in the form of the at least one hologram imparting energy to the gaseous medium, the energy causing the gaseous medium to dissociate and deposit a solid three-dimensional structure on the platform.~~

9. (Currently Amended) A method for forming a three-dimensional solid structure, the method comprising:

establishing a process environment having a controllable pressure, temperature and atmospheric composition, wherein the atmospheric composition comprises gas precursors; and

imaging a first hologram within the process environment, wherein the hologram impart ~~projecting an electromagnetic energy in the form of at least one hologram into a medium, the electromagnetic energy in the form of the at least one hologram imparting energy to the medium, the medium changing through at least one phase to form a three-dimensional solid structure.~~ to the gas precursors, causing the gas precursors to dissociate, wherein dissociated solids from the gas precursors form a first solid layer corresponding to the hologram; and

imaging a subsequent hologram within the process environment, wherein the subsequent hologram energy to the gas precursors, causing the gas precursors to dissociate, wherein dissociated solids from the gas precursors form a subsequent solid layer corresponding to the subsequent hologram, wherein the subsequent solid layer is joined to the first solid layer.

10. (New) The apparatus of Claim 1, wherein the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the at least one hologram.

11. (New) The apparatus of Claim 1, wherein the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors.

12. (New) The apparatus of Claim 1, wherein a pressure and temperature of the gaseous medium within the processing chamber are manipulated to manipulate a deposition rate of the dissociated gas precursors.

13. (New) The apparatus of Claim 1, wherein an intensity of the at least one hologram is manipulated to manipulate a deposition rate of the dissociated gas precursors.

14. (New) The apparatus of Claim 3 wherein the gaseous organometallic compounds allow metal to be deposited in the pattern corresponding to the at least one hologram.

15. (New) The apparatus of Claim 1, wherein the at least one hologram is projected onto a stage within the processing chamber.
16. (New) The apparatus of Claim 15, wherein the stage is thermally biased.
17. (New) The apparatus of Claim 1, wherein the holographic projector further comprises a computer driven phase plate illuminated by a laser source to generate the at least one hologram.
18. (New) The method of Claim 9, wherein the energy to dissociate gas precursors corresponds to a wavelength of electromagnetic energy used to project the first hologram and subsequent hologram.
19. (New) The method of Claim 9, wherein the energy to dissociate gas precursors corresponds to absorption bands of the gas precursors.
20. (New) The method of Claim 9, wherein a pressure and temperature of the gaseous medium within the processing chamber are manipulated to manipulate a deposition rate of the dissociated solids.
21. (New) The method of Claim 9, wherein an intensity of the first hologram and subsequent hologram is manipulated to manipulate a deposition rate of the dissociated solids.
22. (New) The apparatus of Claim 9 wherein the gas precursors are gaseous organometallic compounds that allow metal to be deposited as the dissociated solids.
23. (New) The method of Claim 9, wherein the first hologram and subsequent hologram are projected onto a stage within the processing environment.
24. (New) The method of Claim 23, wherein the stage is thermally biased.
25. (New) The method of Claim 9, wherein a holographic projector comprising a computer driven phase plate illuminated by a laser source is used to generate the first hologram and subsequent hologram.